CLAIMS

1 A gas turbine engine system comprising:
a first compression stage;
a second compression stage;
a combustor;
a controller;
a first sensor for sensing the speed of the first compression stage and providing a first indication of the sensed speed to the controller; and
a second sensor for sensing the speed of the second compression stage and providing a second indication of the sensed speed to the controller,
wherein the controller is operable to control the supply of fuel to the combustor in dependence upon the first indication received from the first sensor and the second indication received from the second sensor.

2 A gas turbine engine system as claimed in claim 1, wherein the controller is operable to create a composite parameter from the received first and second indications.

3 A gas turbine engine system as claimed in claim 2 wherein the composite parameter is created from the combination of the first indication and the second indication in different proportions.

4 A gas turbine engine system as claimed in claim 2, wherein the proportions are dependent upon the moments of inertia of the spool(s) for the first compression stage and the spool(s) for the second compression stage.

5 A gas turbine engine system as claimed in claim 2, wherein the proportions reflect the kinetic energy of the spool(s) for the first compression stage and the kinetic energy of the spool(s) for the second compression stage.

6 A gas turbine engine system as claimed in claim 2, wherein the composite parameter is representative of at least the kinetic energy of the first and second compression stages.

7 A gas turbine engine system as claimed in claim 2, wherein the controller forms part of a feedback system operable to control the rate of change of the composite parameter.

8 A gas turbine engine system as claimed in claim 1, wherein the controller is operable to determine a target value and a current value using the first and second indications and to compare the target value and the current value, wherein the control of the fuel supply to the combustor is dependent upon the comparison.

9 A gas turbine engine system as claimed in claim 8, wherein the determination of the target value includes thermodynamic corrections.

10 A gas turbine engine system as claimed in claim 8, wherein the determination of the target value additionally uses an engine pressure indication.

11 A gas turbine engine system as claimed in claim 8, wherein the determination of the target value additionally uses an engine temperature indication.

12 A gas turbine engine system as claimed in claim 8, wherein the target value is a target rate of change of a composite parameter.

13 A gas turbine engine system as claimed in claim 12, wherein the controller is operable to determine, from a current value of the composite parameter, the target rate of change of the composite parameter.

14 A gas turbine engine system as claimed in claim 13, wherein the controller is operable to correct the composite parameter using an engine temperature

indication and to use the corrected composite parameter to determine the target rate of change of the composite parameter.

15 A gas turbine engine system as claimed in claim 14, wherein the controller stores a predetermined schedule of rates of change of the composite parameter against the corrected composite parameter, for determining the target rate of change of the composite parameter.

16 A gas turbine engine system as claimed in claim 8, wherein the current value is the actual rate of change of the composite parameter.

17 A gas turbine engine system as claimed in claim 1, further comprising a temperature sensor for providing an engine temperature indication to the controller.

18 A gas turbine engine system as claimed in claim 17, wherein the temperature sensor is located at the engine inlet.

19 A gas turbine engine system as claimed in claim 1, further comprising a pressure sensor for providing a pressure indication to the controller.

20 A gas turbine engine system as claimed in claim 19, wherein the pressure sensor is located at the engine inlet.

21 A multi-spool gas turbine engine system comprising:
a first spool;
a second spool;
a combustor;
a controller;
a first sensor for sensing the speed of the first spool and providing a first indication of the sensed speed to the controller; and

a second sensor for sensing the speed of the second spool and providing a second indication of the sensed speed to the controller,
wherein the controller is operable to control the supply of fuel to the combustor in dependence upon the first indication received from the first sensor and the second indication received from the second sensor.

22 A method of controlling the acceleration of an aero-engine from idle, comprising the steps of:
a) sensing the speed of the first compression stage;
b) sensing the speed of the second compression stage; and
c) controlling the supply of fuel in dependence upon steps a) and b).

23 A method as claimed in claim 22, wherein step c) includes the step of controlling the rate of change of a composite parameter, which is dependent upon the speed of the first compression stage and the speed of the second compression stage.

24 A method as claimed in claim 22, wherein step c) includes the steps:
d) determining a target rate of change value using at least the speed of the first compression stage and the speed of the second compression stage;
e) determining a current rate of change value using the speed of the first compression stage and the speed of the second compression stage;
f) comparing the target rate of change value and the current rate of change value; and
g) controlling the supply of fuel supply in dependence upon the comparison.

25 A method as claimed in claim 24, wherein step d) includes the steps:
h) measuring engine pressure;
i) measuring engine temperature;
j) determining a composite parameter value;
k) correcting the composite parameter using the measured engine temperature;

l) determining the target rate of change of the composite parameter using the corrected composite parameter; and

k) correcting the target rate of change of the composite using the measured engine pressure.

26 An acceleration controller for a gas turbine engine comprising:

a first input for receiving an indication of the speed of a first compression stage;

a second input for receiving an indication of the speed of a second compression stage; and

processing means operable to control the supply of fuel to the engine in dependence upon the indications received at the first and second inputs.

27 An acceleration controller as claimed in claim 26 operable to determine a target value and a current value using the indication received at the first input and the indication received at the second input and to compare the target value and the current value, wherein the control of the fuel supply to the combustor is dependent upon the comparison.